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TECHNICAL SCIENCES

ТРАНСВЕРСАЛ ИЗОТРОП ЖИСМ УЧУН ИККИ ЎЛЧОВЛИ ТЕРМОЭЛАСТИК БОҒЛИҚ МАСАЛАНИ МАТЕМАТИК МОДЕЛИ ВА УНИНГ ДАСТУРИЙ ТАЪМИНОТИ

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АННОТАЦИЯ: Бугунги кунда Ўзбекистон Республикаси Қуролли Кучлари қўшинларида ҳарбий хизматчиларнинг касбий маҳорати, ҳарбий қисм ва бўлинмаларнинг жанговар қобилиятини реал ошириш, қўшинлар жанговар тайёргарлигини ташкиллаштириш тизимини такомиллаштириш борасида мунтазам ишлар олиб борилмоқда. Ҳозирги даврда компьютер технологияларининг жадал суратлар билан ривожланиши, бу каби ишларни юқори самарадорликда бажаришга имкон беради. Аввалдан берилган хоссаларга эга бўлган мураккаб конфигурацияга эга материалларни яратиш ва улардан ишлаб чиқаришнинг турли соҳаларида фойдаланиш долзарб илмий техникавий муаммолардан бири ҳисобланади. Ҳозирги кунда мураккаб конфигурациялик материаллар турли соҳаларда, масалан, космонавтика, атом энергетикасида, ҳарбий авиация, ҳарбий қуролланиш, самолётсозлик, машинасозлик, автомобилсозлик, қурилиш ва турли соҳаларда кенг фойдаланилмоқда. Келтирилган ушбу мақолада трансверсал изотроп жисмлар учун икки ўлчовли термоэластик боғлиқ масалани математик модели ва унинг дастурий таъминоти фойдаланиш масалалари кўриб чиқилган. Ушбу модел асосида тузилган алгоритм ва унинг дастурий таъминоти асосида олинган натижаси ва унинг визуал кўриниши келтирилиб ўтилган [2].

КАЛИТ СЎЗЛАР: Композицион, конструкция, термоэластик, иссиқлик ўтказувчанлик, деформация, математик модел, динамик, тензор, квадрат пластина.

КИРИШ

Ўзбекистон Республикаси амалда ўзининг хавфсизлиги, барқарорлиги, сарҳадларимизнинг дахлсизлигини химоя қилишга қодир бўлган тажрибали миллий армиясига эга. Шунинг алоҳида таъкидлаш жоизки, қўшинларда фойдаланиладиган қурол-аслаҳа ва техниканинг иссиқликка чидамлилигини ошириш ҳар доим долзарб масала бўлиб келмоқда. Бу муаммоларни бартараф этиш мақсадида ишлаб чиқариш соҳаларида композицион материаллардан фойдаланиш замон талабига айланиб бормоқда. Конструкциялар ва улар элементларининг термоэластик ҳолатларини математик моделлаштириш ва сонли ечимларини аниқлаш долзарб муаммоларидандир. Композицион материалларни математик моделлаштиришда материал бир жинсли ва анизотроп материал билан алмаштирилади. Термоэластик масалалар қўйилишига қараб боғлиқ ва боғлиқ бўлмаган чегаравий масалаларга ажралади. Умумий ҳолда боғлиқ масалада қаттиқ жисмнинг ҳаракат тенгламалари иссиқлик ўтказувчанлик тенгламалари билан биргаликда қаралади. Боғлиқ масалаларни математик моделларини ва уларни сонли ечиш

алгоритмларини ўрганиш, олинган сонли натижаларга асосан янгидан-янги композицион материалларни таклиф этиш қўшинларда фойдаланиладиган қурол-аслаҳа ва техникаларни ишлаб чиқаришнинг кўплаб бошқа соҳаларида катта фойда келтиради [1,2].

ТАДҚИҚОТ МАТЕРИАЛЛАРИ ВА МЕТОДОЛОГИЯСИ

Қуйида трансверсал изотроп жисмлар учун термоэластик масаланинг динамик боғлиқлигининг математик модели ва бу моделни сонли ечиш қаралади. Трансверсал изотроп жисмлар учун боғлиқ динамик масаланинг икки ўлчовли ҳолда ҳаракат тенгламалари қуйидагича:

$$C_{1111} \frac{\partial^2 u}{\partial x^2} + (C_{1122} + C_{1212}) \frac{\partial^2 v}{\partial x \partial y} +$$

$$C_{1212} \frac{\partial^2 u}{\partial y^2} - \beta_{11} \frac{\partial T}{\partial x} + X_1 = \rho \frac{\partial^2 u}{\partial t^2}$$

$$C_{1212} \frac{\partial^2 v}{\partial x^2} + (C_{1212} + C_{2211}) \frac{\partial^2 u}{\partial x \partial y} +$$

$$C_{2222} \frac{\partial^2 v}{\partial y^2} - \beta_{22} \frac{\partial T}{\partial y} + X_2 = \rho \frac{\partial^2 v}{\partial t^2}$$

Трансверсал изотроп жисмлар учун иссиқлик тарқалиши тенгламаси:

$$\lambda_{11} \frac{\partial^2 T}{\partial x^2} + \lambda_{22} \frac{\partial^2 T}{\partial y^2} - c_\varepsilon \frac{\partial T}{\partial t} -$$

$$T(\beta_{11} \frac{\partial^2 u}{\partial x \partial t} + \beta_{22} \frac{\partial^2 v}{\partial y \partial t}) = 0 \quad (3)$$

(3) бу тенглама учун бошланғич шартлар қуйидагича

$$u(x, y, t)|_{t=0} = \varphi_1, \quad \frac{\partial u}{\partial t}|_{t=0} = \psi_1, \quad v(x, y, t)|_{t=0} = \varphi_2, \\ \frac{\partial v}{\partial t}|_{t=0} = \psi_2, \quad T(x, y, t)|_{t=0} = T_0 \quad (4)$$

ва чегаравий шартлар қуйидагича бўлади

$$u(x, y, t)|_{x=0} = u_0; \quad u(x, y, t)|_{x=\ell_1} = \bar{u}_0; \\ u(x, y, t)|_{y=0} = u'_0; \quad u(x, y, t)|_{y=\ell_2} = \bar{u}'_0 \\ v(x, y, t)|_{x=0} = v_0; \quad v(x, y, t)|_{x=\ell_1} = \bar{v}_0; \\ v(x, y, t)|_{y=0} = v'_0; \quad v(x, y, t)|_{y=\ell_2} = \bar{v}'_0 \quad (5) \\ T(x, y, t)|_{x=0} = T_1(t); \quad T(x, y, t)|_{x=\ell_1} = T_2(t); \\ T(x, y, t)|_{y=0} = T'_1(t); \quad T(x, y, t)|_{y=\ell_2} = T'_2(t)$$

Бу ерда: σ_{ij} - кучлар тензори, X_i - хажмий кучлар, C_{ijkl} - жисмни характерловчи параметрлари, ε_{ij} - деформациялар тензори, β_{ij} - хажмий иссиқлик кенгайиши коэффициенти, δ_{ij} - Кронекер символи, бунда: $\delta_{ij} = \begin{cases} 1, & i=j \\ 0, & i \neq j \end{cases}$ c_ε - доимий температурада иссиқлик сиғим β_{ij} - иссиқлик кенгайиши тензори, λ_{ij} - иссиқлик қуюми тензори ва Коши муносабати, $\dot{\theta}$ - температура, ρ - зичлиги, $t \geq 0, \quad 0 \leq x \leq l_1, \quad 0 \leq y \leq l_2$ да 3та: $x = ih_1, (i=0, k), \quad y = jh_2 (j=0, k), \quad t = n\tau \quad (n=0, 1, 2, \dots)$ параллел тўғри чизиқлар оиласини қуриб (1)-(3) тенгламаларни турли муносабатларда уларнинг хосилаларига алмаштирамиз.

$$C_{1111} \frac{u_{i+1,j}^n - 2u_{i,j}^n + u_{i-1,j}^n}{h_1^2} + \\ (C_{1122} + C_{1212}) \frac{v_{i+1,j+1}^n - v_{i-1,j+1}^n - v_{i+1,j-1}^n + v_{i-1,j-1}^n}{4h_1h_2} + \\ + C_{1212} \frac{u_{i,j+1}^n - 2u_{i,j}^n + u_{i,j-1}^n}{h_2^2} - \\ \beta_{11} \frac{T_{i+1,j}^n - T_{i-1,j}^n}{2h_1} = \rho \frac{u_{i,j}^{n+1} - 2u_{i,j}^n + u_{i,j}^{n-1}}{\tau^2} \quad (6)$$

$$C_{2222} \frac{v_{i,j+1}^n + 2v_{i,j}^n + v_{i,j-1}^n}{h_2^2} + \\ (C_{1212} + C_{2211}) \frac{u_{i+1,j+1}^n - u_{i-1,j+1}^n - u_{i+1,j-1}^n + u_{i-1,j-1}^n}{4h_1h_2} + \\ + C_{1212} \frac{v_{i+1,j}^n - 2v_{i,j}^n + v_{i-1,j}^n}{h_1^2} - \\ \beta_{22} \frac{T_{i,j-1}^n - T_{i,j+1}^n}{2h_2} = \rho \frac{v_{i,j}^{n+1} - 2v_{i,j}^n + v_{i,j}^{n-1}}{\tau^2} \quad (7)$$

$$\lambda_{11} \frac{T_{i+1,j}^n - 2T_{i,j}^n + T_{i-1,j}^n}{h_1^2} + \\ \lambda_{22} \frac{T_{i,j+1}^n - 2T_{i,j}^n + T_{i,j-1}^n}{h_2^2} - \\ c_\varepsilon \frac{T_{i,j}^{n+1} - T_{i,j}^n}{\tau} - \\ - T_0 (\beta_{11} \frac{u_{i+1,j}^{n+1} - u_{i-1,j}^{n+1} - u_{i+1,j}^{n-1} + u_{i-1,j}^{n-1}}{4h_1\tau} + \\ \beta_{22} \frac{v_{i,j+1}^{n+1} - v_{i,j-1}^{n+1} - v_{i,j+1}^{n-1} + v_{i,j-1}^{n-1}}{4h_2\tau}) = 0 \quad (8)$$

Юқоридаги (6)-(7) ва (8) - тенгламалардан $u_{i,j}^{n+1}, v_{i,j}^{n+1}, T_{i,j}^{n+1}$ ларни топамиз.

$$u_{i,j}^{n+1} = \frac{\tau^2}{\rho} (C_{1111} \frac{u_{i+1,j}^n - 2u_{i,j}^n + u_{i-1,j}^n}{h_1^2} + \\ (C_{1122} + C_{1212}) \frac{v_{i+1,j+1}^n - v_{i-1,j+1}^n - v_{i+1,j-1}^n + v_{i-1,j-1}^n}{4h_1h_2} + \\ + C_{1212} \frac{u_{i,j+1}^n - 2u_{i,j}^n + u_{i,j-1}^n}{h_2^2} - \\ \beta_{11} \frac{T_{i+1,j}^n - T_{i-1,j}^n}{2h_1}) + 2u_{i,j}^n - u_{i,j}^{n-1} \quad (9)$$

$$v_{i,j}^{n+1} = \frac{\tau^2}{\rho} (C_{2222} \frac{v_{i,j+1}^n + 2v_{i,j}^n + v_{i,j-1}^n}{h_2^2} + (C_{1212} + C_{2211}) \frac{u_{i+1,j+1}^n - u_{i-1,j+1}^n - u_{i+1,j-1}^n + u_{i-1,j-1}^n}{4h_1h_2} + C_{1212} \frac{v_{i+1,j}^n - 2v_{i,j}^n + v_{i-1,j}^n}{h_1^2} - \beta_{22} \frac{T_{i,j-1}^n - T_{i,j-1}^n}{2h_2}) + 2v_{i,j}^n - v_{i,j}^{n+1} \quad (10)$$

$$T_{i,j}^{n+1} = \frac{\tau}{c_\varepsilon} (\lambda_{11} \frac{T_{i+1,j}^n - 2T_{i,j}^n + T_{i-1,j}^n}{h_1^2} + \lambda_{22} \frac{T_{i,j+1}^n - 2T_{i,j}^n + T_{i,j-1}^n}{h_2^2} - T_0 (\beta_{11} \frac{u_{i+1,j}^{n+1} - u_{i-1,j}^{n+1} - u_{i+1,j}^{n-1} + u_{i-1,j}^{n-1}}{4h_1\tau} + \beta_{22} \frac{v_{i,j+1}^{n+1} - v_{i,j-1}^{n+1} - v_{i,j+1}^{n-1} + v_{i,j-1}^{n-1}}{4h_2\tau})) + T_{i,j}^n \quad (11)$$

(9)-(11) тенгламалар t^{n+1} қатламда $u(x, y, t)$, $v(x, y, t)$, $T(x, y, t)$ функцияларнинг қийматларини топишга имкон беради, агар олдинги 2 та қатламнинг қиймати маълум бўлса, 2 та бошланғич қатламлардаги ($n=0$ à $n=1$) бошланғич шартлардан $u(x, y, t)$ ва $v(x, y, t)$ функцияларнинг қийматини топамиз, $T(x, y, t)$ функциянинг қийматини эса 1-қатламда (11) муносабатдаги аралаш ҳосилани бошқа муносабатга алмаштириш орқали топамиз [3,4].

$$u_{i,j}^1 = \frac{\tau^2}{\rho} (C_{1111} \frac{u_{i+1,j}^0 - 2u_{i,j}^0 + u_{i-1,j}^0}{h_1^2} + (C_{1122} + C_{1212}) \frac{v_{i+1,j+1}^0 - v_{i-1,j+1}^0 - v_{i+1,j-1}^0 + v_{i-1,j-1}^0}{4h_1h_2} + C_{1212} \frac{u_{i,j+1}^0 - 2u_{i,j}^0 + u_{i,j-1}^0}{h_2^2} - \beta_{11} \frac{T_{i+1,j}^0 - T_{i-1,j}^0}{2h_1}) + 2u_{i,j}^0 - u_{i,j}^{-1} \quad (12)$$

$$v_{i,j}^1 = \frac{\tau^2}{\rho} (C_{2222} \frac{v_{i,j+1}^0 + 2v_{i,j}^0 + v_{i,j-1}^0}{h_2^2} + (C_{1212} + C_{2211}) \frac{u_{i+1,j+1}^0 - u_{i-1,j+1}^0 - u_{i+1,j-1}^0 + u_{i-1,j-1}^0}{4h_1h_2} + C_{1212} \frac{v_{i+1,j}^0 - 2v_{i,j}^0 + v_{i-1,j}^0}{h_1^2} - \beta_{22} \frac{T_{i,j-1}^0 - T_{i,j-1}^0}{2h_2}) + 2v_{i,j}^0 - v_{i,j}^1 \quad (13)$$

$$T_{i,j}^1 = \frac{\tau}{c_\varepsilon} (\lambda_{11} \frac{T_{i+1,j}^0 - 2T_{i,j}^0 + T_{i-1,j}^0}{h_1^2} + \lambda_{22} \frac{T_{i,j+1}^0 - 2T_{i,j}^0 + T_{i,j-1}^0}{h_2^2} - T_0 (\beta_{11} \frac{u_{i+1,j}^1 - u_{i-1,j}^1 - u_{i+1,j}^{-1} + u_{i-1,j}^{-1}}{4h_1\tau} + \beta_{22} \frac{v_{i,j+1}^1 - v_{i,j-1}^1 - v_{i,j+1}^{-1} + v_{i,j-1}^{-1}}{4h_2\tau})) + T_{i,j}^0 \quad (14)$$

(6) тенгламани қуйидаги кўринишда ёзиш мумкин:

$$a_i u_{i+1,j}^{n+1} + b_i u_{i,j}^{n+1} + c_i u_{i-1,j}^{n+1} = f_i \quad (15)$$

$$\text{бунда } a_i = \frac{C_{1111}}{h_1^2}, \quad b_i = -2(\frac{C_{1111}}{h_1^2} + \frac{\rho}{\tau^2}),$$

$$c_i = \frac{C_{1111}}{h_1^2} \text{ ва}$$

$$f_i = \rho \frac{-2u_{i,j}^n + u_{i,j}^{n-1}}{\tau^2} -$$

$$(C_{1122} + C_{1212}) \frac{v_{i+1,j+1}^n - v_{i-1,j+1}^n - v_{i+1,j-1}^n + v_{i-1,j-1}^n}{4h_1h_2} -$$

$$-C_{1212} \frac{u_{i,j+1}^n - 2u_{i,j}^n + u_{i,j-1}^n}{h_2^2} +$$

$$\beta_{11} \frac{T_{i+1,j}^n - T_{i-1,j}^n}{2h_1}$$

(7)-тенгламани қуйидаги кўринишда ёзиш мумкин:

$$a_i v_{i+1,j}^{n+1} + b_i v_{i,j}^{n+1} + c_i v_{i-1,j}^{n+1} = f_i \quad (16)$$

$$\text{Бунда } a_i = \frac{C_{1111}}{h_1^2}, \quad b_i = -2(\frac{C_{1111}}{h_1^2} + \frac{\rho}{\tau^2}),$$

$$c_i = \frac{C_{1111}}{h_1^2} \text{ ва}$$

$$f_i = \rho \frac{2v_{i,j}^n + v_{i,j}^{n-1}}{\tau^2} -$$

$$(C_{1122} + C_{1212}) \frac{u_{i+1,j+1}^n - u_{i-1,j+1}^n - u_{i+1,j-1}^n + u_{i-1,j-1}^n}{4h_1h_2} +$$

$$+ C_{1212} \frac{v_{i+1,j}^n - 2v_{i,j}^n + v_{i-1,j}^n}{h_2^2} +$$

$$\beta_{22} \frac{T_{i,j-1}^n - T_{i,j-1}^n}{2h_1}$$

(8)-тенгламани эса қуйидаги кўринишда ёзиш мумкин:

$$a_i T_{i+1,j}^{n+1} + b_i T_{i,j}^{n+1} + c_i T_{i-1,j}^{n+1} = f_i \quad (17)$$

Бунда $a_i = \frac{\lambda_0}{h_1^2}$, $b_i = -\frac{2\lambda_0}{h_1^2} - \frac{C_\varepsilon}{\tau}$, $c_i = \frac{\lambda_0}{h_1^2}$ ва

$$f_i = \lambda_{22} \frac{T_{i,j+1}^n - 2T_{i,j}^n + T_{i,j-1}^n}{h_2^2} -$$

$$\lambda_{11} \frac{T_{i+1,j}^n - 2T_{i,j}^n + T_{i-1,j}^n}{h_1^2} -$$

$$T_0 \left(\beta_{11} \frac{u_{i+1,j}^{n+1} - u_{i-1,j}^{n+1} - u_{i+1,j}^{n-1} + u_{i-1,j}^{n-1}}{4h_1\tau} + \right. \quad (15)-$$

$$\left. + \beta_{22} \frac{v_{i,j+1}^{n+1} - v_{i,j-1}^{n+1} - v_{i,j+1}^{n-1} + v_{i,j-1}^{n-1}}{4h_2\tau} \right) -$$

$$C_\varepsilon \frac{T_{i,j}^{n+1} - T_{i,j}^n}{\tau}$$

тенгламани $u(x, y, t)|_{x=\ell_1} = u_0$, $u(x, y, t)|_{x=\ell_1} = \bar{u}_0$,

чегаравий шартлар билан, (16)-тенгламани

$v(x, y, t)|_{x=0} = v_0$, $v(x, y, t)|_{x=\ell_1} = \bar{v}_0$ чегаравий

шартлар билан (17)-тенгламани

$T(x, y, t)|_{x=0} = T_1(t)$, $T(x, y, t)|_{x=0} = T_2(t)$ чегаравий

шартлар билан бирга, тўрлар методи билан ечилган [4].

ТАДҚИҚОТ НАТИЖАЛАРИ

Киритилишчи константалар: **Lyambda11**, **Lyambda22** - Иссиқлик куюми тензорлари; **Betta11**, **Betta22** - Биринчи ва иккинчи ҳаракат тенгласидаги ҳажмий иссиқлик кенгайиши коэффициентлари; **C1111**, **C1122**, **C1212**, **C2222** - жисмни характерловчи параметрлари; **Ro** - Жисм зичлиги; **C_ε** - Доимий температурадаги иссиқлик сиғими; **T₀** - Жисмга қўйиладиган температураси; **h₁** - X ўқи бўйича тугун нуқталар орасидаги баландлик; **h₂** - Y ўқи бўйича тугун нуқталар орасидаги баландлик; **tao** - Қаламларнинг вақт оралиғи; **n** - Қадамлар сони [5]. **Lyambda11 - 0.5**, **Lyambda22 - 0.3**, **Betta11 - 0.05**, **Betta22 - 0.09**, **C1111 - 0.75**, **C1122 - 0.91**, **C1212 - 0.9**, **C2222 - 0.89**, **Ro - 1.1**, **C_ε - 3.4**, **T₀ - 5**, **h₁ - 0.1**, **h₂ - 0.1**, **tao - 0.01**, **n - 10**.

U,V,T ларнинг икки ўлчовли квадрат пластинадаги ўзгариш ҳолатини қуйидагича кўришимиз мумкин. Бунда кирилган ўзгармас сонлар асосида қуйидаги натижаларни оламиз:

АНИҚ YECHIM										
0	0	0	0	0	0	0	0	0	0	0
0	0,101126368	0,185684113	0,252046359	0,293794033	0,306812010	0,289827282	0,244466566	0,175102028	0,089235882	0
0	0,185716123	0,347549633	0,475361001	0,556720139	0,583638414	0,553483529	0,469170091	0,338856295	0,176014518	0
0	0,252108725	0,475393673	0,652158397	0,765182110	0,803379764	0,763016067	0,648003933	0,469500570	0,245683689	0
0	0,293854492	0,556752805	0,765182107	0,898817978	0,944559730	0,897934346	0,763467060	0,554216581	0,291357754	0
0	0,306870364	0,583671075	0,803379761	0,944559730	0,993372560	0,945044918	0,804268499	0,584719229	0,308571029	0
0	0,289883532	0,553516185	0,763016064	0,897934346	0,945044918	0,899740908	0,766418336	0,558025705	0,295640259	0
0	0,244554278	0,469236937	0,648038125	0,763501255	0,804302694	0,766452530	0,653617883	0,476747171	0,253830760	0
0	0,175317995	0,339074559	0,469689119	0,554406119	0,584908540	0,558213598	0,476897556	0,348830372	0,187227178	0
0	0,088738177	0,175702262	0,245366322	0,291036899	0,308247329	0,295314697	0,253503743	0,186880572	0,102176276	0
0	0	0	0	0	0	0	0	0	0	0

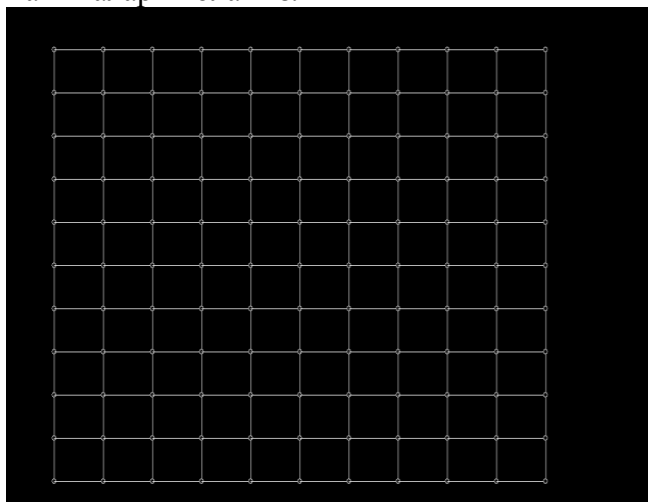
1-расм. Аниқ ечимнинг жадвалдаги кўриниши

TAQRIBIY YECHIM											
0	0	0	0	0	0	0	0	0	0	0	0
0	0,105549970	0,188964923	0,253809616	0,293853265	0,305197493	0,286732940	0,240245674	0,170251471	0,083279559	0	0
0	0,188685799	0,349034689	0,475102889	0,554717880	0,580094652	0,548751650	0,463753731	0,333382823	0,170400800	0	0
0	0,253491026	0,475047234	0,650036831	0,761460485	0,798422663	0,757308887	0,642139591	0,464172251	0,240747894	0	0
0	0,293544309	0,554667643	0,761468760	0,893806578	0,938740337	0,891876030	0,757796443	0,549611962	0,287572033	0	0
0	0,304898947	0,580054542	0,798444389	0,938755246	0,987266580	0,939234536	0,799356105	0,581312559	0,306275057	0	0
0	0,286437936	0,548718727	0,757341270	0,891904370	0,939249425	0,894746628	0,762747868	0,556167422	0,295027770	0	0
0	0,239960051	0,463717276	0,642171625	0,757828238	0,799377211	0,762755530	0,651544417	0,476628994	0,254928568	0	0
0	0,169322758	0,332610087	0,463427334	0,548868133	0,580558519	0,555399514	0,475870870	0,349754743	0,189691914	0	0
0	0,084483256	0,171263843	0,241609536	0,288427854	0,307122398	0,295865076	0,255776242	0,190787565	0,106473675	0	0
0	0	0	0	0	0	0	0	0	0	0	0

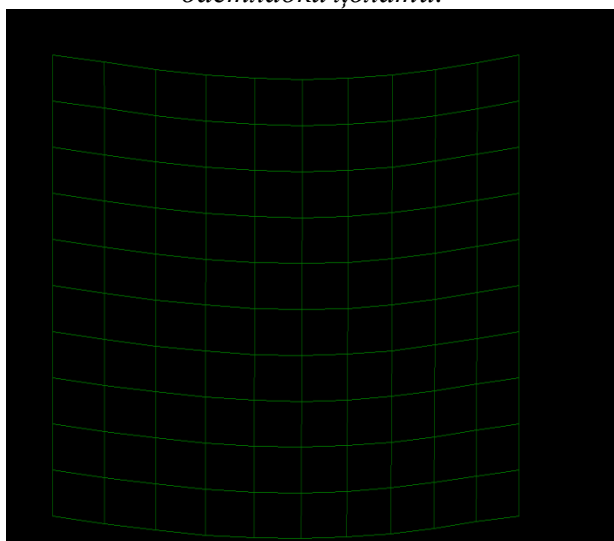
2-расм. Тақрибий ечимнинг жадвалдаги

кўриниши

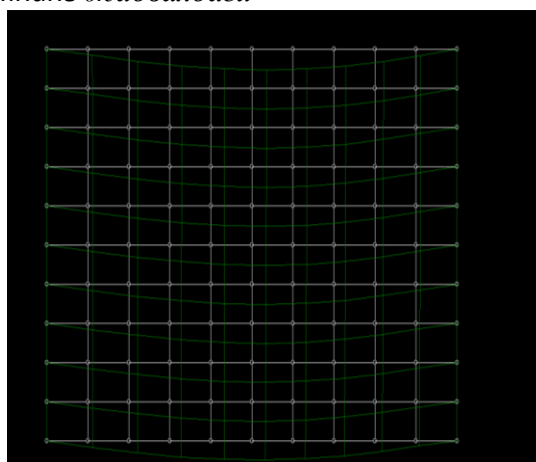
1, 2-расмларда келтирилган натижалар асосида куйидаги график кўринишдаги натижаларни оламит.



3-расм. Квадрат пластинанинг дастлабки ҳолати.



4-расм. Квадрат пластинанинг U, V бўйича силжииш ҳолати.



5-расм. Квадрат пластинани температура таъсир қилгандаги ҳолати билан солиштириши.

ХУЛОСА

Ўзбекистон Республикасининг муҳофаа ва хавфсизликни таъминлашга қаратилган барча тизимли чора-тадбирлари ва саъи-ҳаракатлари минтақа ва жаҳон миқёсида тинчлик ва осойишталикни таъминлашга қаратилган. Хулоса қилиб айтганда амалиётда учрайдиган кўплаб масалаларни математик моделлари термоэластик ёки термопластик боғлиқ ва боғлиқ бўлмаган масалаларни ўрганишга келтирилади. Келгуси тадқиқот ишларимиз ва мақолаларимизда боғлиқ масалаларга қўшимча ташқи таъсирлар орқали унинг ҳолатини ўзгаришини, уларни сонли ечиш усуллари ўрганиш ва бу масалаларнинг дастурий таъминотини яратиш билан давом эттирамиз.

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INFORMATION AND COMMUNICATION TECHNOLOGIES AND THEIR SIGNIFICANCE

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Abstract. The article describes information technology, information communication channels, modern information and communication technologies (ICT), tools, their importance, classification and characteristics.

Keywords: ICT, cloud computing, software, hardware, economic operations (transactions), communication technologies, database, telephone, mobile technologies, multimedia technologies, electronic mail (e-mail), conference, teletext, web camera, Internet.

Currently, ICT is rapidly being introduced into every sector of society, increasing the efficiency of professional activity. We could not imagine our daily life without modern devices such as not only television, radio, but also mobile phones, computers, and tablets. They enriched the content of our lives, eased our tasks in work and education. Currently, the introduction of ICT in the education system, among all other areas, is an urgent issue.

In the speech of the Acting President of Uzbekistan and the Prime Minister of the Republic Sh.M. Mirziyoyev on September 8, 2016 at the joint meeting of the Legislative Chamber of the Oliy Majlis and the Senate, the tasks and importance of the widespread introduction of ICT systems were emphasized as follows: "We will continue to implement the strategy carefully thought out and developed by the President of the Republic of Uzbekistan on the formation of modern or transport and engineering infrastructure connected to international communication networks, as well as the development of national information and communication systems"[1]. As noted in this speech, the development of ICT in our country, the adoption of the President's decision PQ-4699 of April 28, 2020 "On measures for the wide introduction of digital economy and electronic government", electronic government (my.gov.uz) system, providing high-quality mobile communication services to customers, development of the national postal system, implementation of reforms in the education system in the training of IT specialists, training of experts in the field of artificial intelligence, the President of the Republic of Uzbekistan" It can also be seen in the examples of the works carried out, such as the adoption of Decree No. PF-6079 dated October 5, 2020, "On the approval of the

Digital Uzbekistan - 2030 strategy and measures for its effective implementation".

In the following periods, we observe that the importance of ICT will be emphasized in articles published in many fields. With the introduction of ICT in the educational process, new innovative approaches in accordance with the modern information environment began to appear.

For example, in M. Kadyrov's educational manual entitled "Information technologies", One of the most basic types of information is economic information. Its difference from ordinary information is that it is related to management processes of people in a large community, organization, enterprise and other economic structures[3;7-8]. Information technologies are entering all social, economic, political and spiritual spheres of society. In the transition to an information society, a new information processing industry began to emerge on the basis of ICT.

M.T.Azimdzhanova, M.T.Muradova, M.Pazilov's educational manual entitled "Informatics and information technologies" states that "The process of performing various operations on information and all the technical means and methods that implement these processes are called information technology. The main technical tool of information technology is a computer"[5;8].

"Information and communication technologies" manual of Kazakh teachers states that "Electronic education is a complex system consisting of software and technical tools. Such a system is usually built on a client-server architecture. Since the client and server are on different machines, data transfer becomes one of the main issues. Data exchange is carried out in the education sub-network. It is usually carried out through channels and the Internet

communication network”[6;199]. Organizing education is not easy. In this regard, ICT serves to make the tasks a little easier.

In Sh.Pozilova's educational manual entitled “Pedagogical software tools”, it is stated that before the online education model, until the early 2000s, students were in the classroom, and the educational process was organized very simply with the teacher who led it[7;50]. Modern ICT tools are important not only in the classroom, but also in the process and methods of distance online education (E-learning).

Information society is a society in which most members of the society are engaged in the production, storage, processing and implementation of information, especially its highest form, knowledge. In the transition to an information society, a new information processing industry is emerging on the basis of computer and telecommunication information technologies[4;8]. Modern technologies, changes and new, innovative business models are changing the economic life and spheres of activity of today's society. Information technology includes a number of modern technologies and consists of:

Cloud computing;

Software;

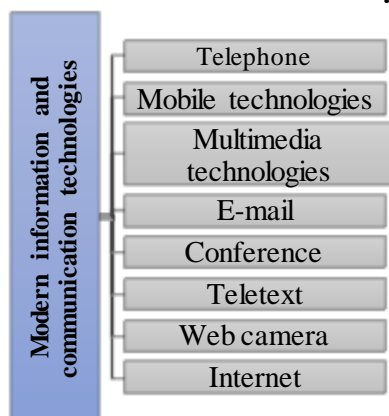
Hardware;

Economic operations (transactions);

Communication technologies;

Database and Internet.

Modern ICT tools, when combined with the help of a network and transfer of image, sound, video and other forms of information, help to animate and manage the educational process, receive and monitor information remotely.



Modern ICTs include:

Below we will discuss these ICT tools and their importance in education.

Telephone. A device that serves to receive and transmit speech and other types of data. Telephone apparatus by A.Bell it was discovered in 1876 and is widely used in the world[2;279].

A telephone is a communication device. With the help of this device, it is possible to exchange information, conduct question-and-answer sessions, and hold mobile conferences while conducting distance education. It is possible to get in touch with any part of the world through mobile city and interstate numbers.

Mobile technologies. It has revolutionized the field of communication and introduced many useful features to communicate anywhere supported by the network. Below are the services related to the exchange of information and knowledge:

- ✚ audio communication (conference);
- ✚ voicemail;
- ✚ sms (text, voice and picture);
- ✚ video conference;
- ✚ internet usage;
- ✚ dictaphone;
- ✚ video camera;
- ✚ calculator;
- ✚ work with documents and information;
- ✚ card and account management;
- ✚ map;
- ✚ microscope;
- ✚ taking notes;
- ✚ Face control;
- ✚ creating holograms, etc.

Mobile technologies are entering education, which has led to the emergence of the concept of mobile education. The support of e-learning resources by mobile devices gives rise to views on it as an element of distance education.

Multimedia technologies. The word “multimedia” is derived from the Latin word media, which in Uzbek means “multiple environments” or “distributor of information”. Multimedia is a special technology that provides the ability to combine simple information (text and graphics) with sound and moving images (video films) with the help of software and hardware.

The use of multimedia technologies in education ensures efficiency and achievement of educational competencies. Educational technical tools working with multimedia environment, including modern tools such as electronic (interactive) board, interactive table, interactive

projector, are used as an effective tool to achieve the desired educational results.

E-mail. Electronic mail is popularly known as e-mail, where text messages are sent to the recipient via telecommunication links. Both sending and receiving e-mail are processed and managed by mail server computers connected via a network. Enables remote electronic exchange of messages, files and necessary resources in e-mail. This feature of it is of special importance in distance education and education management, exchange of official letters.

Conference. A conference is a virtual meeting where people can see, hear, talk and work with people in different parts of the world without the expense of travel. Conferencing can take many forms such as teleconferencing, video conferencing, audio conferencing, multimedia conferencing, screen sharing, and more. Conferencing is a way for several users to interact in a network[2;159]. It serves to organize mutual communication, such as business organizations, forums of educational institutions, discussions, exchange of experience **Teletext.** This is a televised electronic message. This type of text is widely used to broadcast news, business reports to a large group of people at once, stock market news, weather reports, etc. are presented as teletext on televisions.

Currently, not only television texts, but also special online school TV channels have been established, which help to meet the demand for distance education in our country, use the experience of qualified teachers, and provide modern knowledge to young students.

Web camera. A webcam is a camera that captures images and transmits any images that can be displayed on the world wide web through a server web camera. In 1991, the first webcam went live in the computer science department at Cambridge University, and since then, webcams have taken over homes, businesses, public streets and buildings.

For video communication from anywhere in the world, to participate in conferences and

forums, to monitor online training sessions and broadcasts, and to organize remote training controls, you must have web cameras.

Internet. As the latest development in the world of communication, the Internet has increased the speed of communication, connected thousands of computers through a network, and has become an "ocean" of unlimited knowledge. Electronic commerce (electronic commerce), electronic education (e-learning) is based on the Internet architecture and is based on the relationship between interested parties in business, and in education between the teacher and the receiver, in the exchange of information, in the implementation of e-mail, conferences. will help. The Internet has rapidly penetrated all fields with its services. At the same time, it should also be noted that there is information about various mentalities on the Internet, and it is necessary to control that students do not use information that negatively affects the spirituality of young people, to use information for positive purposes, and to use information for various negative purposes. It is necessary not to fall under the influence of information. It depends on how the culture of using the Internet is formed.

In conclusion, it should be noted that modern pedagogues and students need to be aware of modern information technologies along with knowledge of foreign languages. ICT has become a new educational tool of the 21st century. It helps prepare students for their future careers, opens new opportunities for learning and teaching, introduces new methods of teaching in their subjects, new approaches for teachers' professional growth. creates an opportunity to learn, implement ideas and develop new skills, and use their resources wisely. Also, by rationally managing and controlling the educational process, it saves time and money, shortens the process of preparing for lessons, makes the educational process interesting and entertaining for students, improves the competence of searching and storing information, using a computer. helps in the formation of skills.

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PEDAGOGICAL SCIENCES

AWARENESS AND EXTENT OF USAGE OF E-BOOKS IN UNIVERSITY LIBRARIES

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ANNOTATION: The article assessed usage of Electronic books in Delta State University, Abraka and Novena University, Ogume, Nigeria. Undergraduate students were randomly selected for the study. The population of the study was 253 300 and 400 level students of the institutions studied. The instrument employed for data collection was the questionnaire. The 253 students were administered the research tool but 231 of them were retrieved and used for the investigation. The collected data were examined using the frequency count and percentage. The study concluded that the respondents use the e-books to a very high extent; in terms of frequency of usage, the study concluded that on the average, utilization of e-books by the students was weekly; the greatest challenges to e-book provision and usage were insufficient e-books in the library and power supply in that order. Therefore, aggressive e-book collection development is here suggested. Academic Libraries should make e-books readily available and easily reached so as to encourage more, the use of the resources.

Keyword: E-book, E-book usage, Extent of usage, E-book awareness, University libraries, Nigeria

INTRODUCTION

E-books are books that are in electronic form. It may well be explained as the electronic adaptation of a printed book. An e-Book could basically be depicted as electronic book. E-books may be books initially published in a long-established way but digitized for use as an e-book or born digital [1]. E-books are normally intended for consultation on dedicated e-book readers, but, almost any sophisticated electronic gadget that have a adjustable viewing screen, such as computers (laptop, desktop, as well as other microcomputer appliances), tablet computers and Smartphone can also be deployed to explore e-books.

Theoretically, e-books are books in digital form, though there is big disparity. Both of them are in electronic format but they vary. Despite the fact that e-books appear in internet websites which enhances its wider usage and coverage, digital books on the other hand are limited to a particular library and with restricted users. Nevertheless, digital books can become e- books whenever they are positioned on the institutional portals/ website blog and made available through the internet connectivity to such portals to the public [1].

Presently in Nigeria, electronic books are gradually representing an increasingly important component of the resource collection of academic libraries even though in the last few years the emergence and integration of e-books have been at a slow pace. The acquisition of e-books is an

obvious accreditation necessity for libraries as directed by the National Universities Commission (NUC). This may well be associated to the reality that e-books are yet to be recognized as a way out of the paucity of textbooks in tertiary stage of teaching and learning in Nigeria [2].

A good number of libraries will continue to simultaneously offer both digital and print collections for years to come even though libraries of various types are embracing digital collections. Acquisition of new journals, abstracting as well as indexing services and magazines are greatly in the direction of digital, while e-books are in their infant stage in terms of presence in the collection of libraries. Digital collections are preferred for a good number of reasons. These include the following:

- e-books can be associated/accessed from and to abstracting and indexing.
- access can be gotten even from the comfort of patron's office, home, or dormitory even without visiting the physical library.
- the library can get usage statistics that are not available for print collections; and
- space is no challenge in e-book collections environment, and they are comparatively very easy to preserve. In fact, if the entire space costs and processing costs are considered, e-book collections may as well result in total reductions in library financing [3].

Over the years, a good number of libraries have started offering e-books to their esteemed

patrons [4]. The electronic e-books provided to users are usually digital types of books which also are in print. E-books have the same substance as the print version save for the fact that they are created in a different layout/format. These collections of resources offer some advantages as against their print counterpart to both the library and the patrons. To the patrons, they offer unhindered accessibility, they are accessible outside the physical library, copying text and images pasting, and full-text searching. The advantage e-books offer to the library is that they don't require shelving/ re-shelving, shelf space and cannot be mutilated, lost, or stolen.

The circulation component of the library is the front end and a strategic link between the library and the patrons. The inputs from the acquisition, reference, cataloging and classification divisions and bindery are raw materials that the circulation unit uses to provide services to patrons. Earnestly, the circulation unit is the front end for all users and it is the duty of the circulation librarian as a foremost player in the scheme of things is to be acquainted with patrons' needs/requirement in the library. As the foremost player, the Circulation Librarian join's patrons' needs together with the library holdings through Selective Dissemination of Information (SDI) [4].

Also, the circulation unit of the library is responsible for checking materials in and out, whether in electronic format or in print. As it concerns e-books. However, that responsibility can come to fruition only if the entire system is computerized/ automated. The introduction of automation to library service delivery has brought about the need for information professionals to enhance information provision services to the teeming users.

Academic libraries are primary segment of the higher education institutions. Therefore, Librarians must if they still desire to be relevant not be told to brace up and confront the evolving Information Communication Technology. Effective and efficient use of e-books by users is in vogue, not just acquiring without effective use. Before now, circulation information were gathered/ collected manually using the circulation history in the "book card/date tag" from books. However, with the coming of automation systems in libraries, information gathering has been greatly simplified. [5] acknowledged that

circulation analyses seems to be one amongst traditional methods employed in collection evaluation as well as use studies in libraries. The information gathered from circulation analyses have been used in areas such as guiding management decisions in allocating physical space for materials, evaluating collection development policies; identifying information resources that are for offsite storage, funds allocation for materials; in addition to suggesting methods of de-selection. In fact, frequent circulation evaluation of materials in a library collection is an indicator of that library's effectiveness; which invariably means that the collection is serving its purpose.

STATEMENT OF THE PROBLEM

Inadequate awareness has been acknowledged as a setback within the past few years due to the realization that the methods that have been used overtime for assessing usage; loan statistics and similar measures did not bring to the fore accurate/adequate information about the real pattern of usage [6].

[7] noted that the assessment of the extent of awareness and use of e-books has been neglected and research regarding e-books had been concentrated on technologies assessment in terms of vendor prerequisite. Also, how e-book users perceive it as well as the reasons behind eBook use or non-use are significant elements for libraries and e-book publishers, but awareness and usage seems neglected.

Therefore, an examination of the issues of awareness, adoption and usage of e-books in libraries is needed in other to find out what the challenges are and to make certain the incorporation of eBooks in library collections. The moment practical challenges of eBook awareness and adoption are identified, the subject whether users are aware and involved in using e-books become pertinent.

Objectives of the Study

The principal aim of this research is to investigate the extent/degree of awareness and usage of e-books in academic libraries. The objectives are:

- (1). To investigate the extent of awareness of e-books in the academic libraries studied.
- (2). To ascertain the extent of e-books usage in the academic libraries.
- (3). To determine frequency/regularity of eBooks usage by users.

(4). To ascertain the challenges of e-book usage.

LITERATURE REVIEW

Past literature has revealed that investigation with reference to e-books has concentrated to a great extent on the appraisal of technology instead of on how patrons perceive e-books as well as the basic factors underlying usage. There are good number factors that might influence use, for example, the screen size of the reading gadget, may have an effect on reading ease as well as understanding [8]. In addition, a large amount of acquisition funds are being used up by university libraries in Nigeria on Electronic Books (e-books) or on implementation of e-books platforms [9]; [10]. Therefore, it is strategically vital to discern whether the funds spent on the libraries including the effort put into making e-books available is effective. In fact, how the e-book resources are being used and users' awareness of e-books are vital variables for collection management and collection building [11]; [12].

Researchers understand and embark upon the assessment of e-book usage in diverse ways and relative to their institutions, resulting to variety of opinions in literature and research. As preference and interest for e-books increase it should be noted that university libraries have been in the forefront regarding e-books and reference materials provision for their users. Together with printed books, e-books exist to serve the needs of library users [13].

[5] noted that circulation statistics supplied by vendors don't show e-books that are in use, do not make available information concerning the reasons for use, user satisfaction with the format and how e-books are perceived. As a result, there has arisen interest in the study of e-book usage and in-depth user satisfaction. For example, [14] submitted that 59.6 percent of the subjects studied mostly use printed information resources, but occasionally use e-books. The investigation revealed further that hardcopy information resources are very relevant even with the emergence of e-books.

Also, Georgas [15] investigation discovered that e-book usage was low, and as a result needed more promotion to increase awareness. The scholar emphasized further that patrons' interest with respect to e-book usage was very close to nothing. [16] in addition, conducted a study in

eleven Africa countries (Nigeria inclusive), and the scholars revealed that e-books were found in 14 libraries (67%), but not existing in 7 libraries (33%). The investigation as a consequence concluded that e-books are thus far readily available in some but not all academic establishments in Africa.

[17] examined e-book usage at the University of Liverpool and reported that all subject domains had been well used (mathematics not included), and that the number of titles not used is gradually reducing each year; that older e-books appeal more and is continually attracting considerable usage.

[1] in his research noted that in an investigation done by a few American scholars (July 2014), it was revealed that e-books appreciation has improved tremendously in the US. This improvement in 2014 was because 28% of adults did use e-book, as against 23% in 2013. Also, this increment was attained because 50% of the subjects studied as at 2014 did had a dedicated gadget (a tablet or an e-reader, as against 30% with a gadget in 2013. In Nigeria, the precise number of e-books understanding populace is yet to be established but the number may be low even amongst scholars. The explanation for this lapse could vary from soaring poverty as well as high illiteracy in our nation to inadequate knowledge of e-books devices amongst the entire public. Resulting from the above lapses, [18] acknowledged that considering the question of e-book usage is a continuous exercise and additional studies are needed.

In addition, [19] in a London University College study of a group of students, reported that e-books usage was enhanced due to the lapses with the print resources collection, particularly in the sciences and engineering disciplines. The result showed that the clientele were still more willing to use the print collection resources, and would gladly do so when given the required resources. Additionally, [20] noted that in the case for non-reference and reference collections, e-books were utilized more when compared to the hardcopy of those particular editions.

Four studies were done at the University of Rochester, California State University Libraries, University of Pittsburgh, in addition to Wayne State University with data gotten from net Library e-books. In all, Gibbons reported that of the 10 net Library e-book collections available to

University of Rochester users, only one is in print and is owned by the university.

CHALLENGES TO E-BOOK USAGE

Electronic books can be navigated and search easily than their printed counterpart. This factor makes them more favored by student and researchers. Equally, e-books allow libraries to service remote users- it is particularly helpful for university libraries in institutions that are into distance learning programs. E-books solve a number of challenges in libraries [21]. E-books don't get damaged or wear out, can't easily get lost and don't need physical storage space. A shortcoming of e-books usage, and in actual fact one of the variables that have slow down e-book adoption in the book trade, is the embarrassment number of commonly unsuited formats in addition to the unfriendly Digital Rights Management (DRM) schemes.

The coming of e-books and their incorporation into library collections, although have provided opportunities for librarians, they have equally generated a range of challenges [22]; [23]; [24]; [25]. This is due to the fact that unlike physical books, e-book's purchase, organization, as well as access are at variance

from the hard copy books. Also Issues associated with technicality, dependability and functionality, are very important for libraries desiring to create e-book collection/platform. Issues such as hardware/software compatibility and capability, maintenance, storage, search / retrieval functionality, interface usability are likely challenges libraries will encounter when administering e-books physically.

METHODOLOGY

The methodology used was survey technique. The population of the study was 253 300 and 400 level students of the institutions studied. The research tool employed for the investigation was the questionnaire, which was structured to determine relevant information about e- books usage in the university libraries studied. The research tool was validated through the use of 2 experts in the field. Undergraduate students were randomly selected for the study. The 253 students were administered the research tool but 231 of them were retrieved and used for the investigation. Selecting both universities was anchored on the premise that the universities were automated. The collected data were examined using frequency count and simple percentage..

RESULT AND ANALYSIS

Table 1

Distribution of respondents by institution

Delta State University, Abraka.	146 (63.2%)
Novena University, Ogume	85 (36.8%)
Total	231

Table 1 indicates that 85 (36.8%) students from Novena University participated in the study, while 146 (63.2%) were from the Delta State

University. This result shows that more of Delta State University students were used in the study.

Table 2

Extent of Awareness of E-books in the library

Items	No. of Respondents	%
High Extent	198	85.7
Low Extent	20	8.7
Undecided cases	13	5.6
Total	231	100

On extent of e-books awareness in the university libraries, the analysis in Table 2 shows that the students were very much aware to a high extent of the availability of Electronic books. Out of 231 respondents administered the

questionnaire, 198 (85.7 %) affirmed that they were aware to a high extent of e-books existence in the libraries, whereas 20 (8.7%) reported that they were not aware, with 13 (5.6 %) undecided cases.

Table 3

The Extent of E-book usage in the library

Items	No. of Respondents	%
Very High Extent	85	36.8
High Extent	52	22.5

Undecided cases	37	16.0
Low Extent	30	13.0
Very Low Extent	27	11.7
Total	231	100

Also, on the extent of e-books usage in the library, the study found that 85 (36.8 %) of the students acknowledged that they use e-books in the Library to a very high extent, whereas 52 (22.5%) noted that they use e-books to a high

extent. 37 (16.0%) undecided cases were recorded. 30(13.0%) and 27(11.7%) respectively were for low extent and very low extent. The study concluded that the respondents use the e-books to a very high extent.

Table 4

Frequency of E-books usage in the library

Items	No. of Respondents	%
I uses e-books daily	63	27.3
Weekly	72	31.2
Monthly	34	14.7
I don't make use of e-books	62	26.8
Total	231	100

On how often do the respondents use e-books, the research showed in Table 4 that 63 (27.3%) of them uses e-books daily, while 72 (31.2%) use e-books weekly. Also, 34 (14.7%) of

the respondents use e-books monthly, even as 62(28.8%) of them don't make use of e-books. The study concluded that on the average, utilization of e-books by the students is weekly.

Table 5

Challenges of using e-books

Items	No. of Respondents	%
Power supply	61	26.4
Slow bandwidth	22	9.5
Inadequate e-books in the library	96	41.6
Technical issues	25	10.8
Inadequate knowledge of the use of the e-book platform in the library	27	11.7
Total	231	100

Table 4 showed that 96 (41.6%) of respondents affirmed that inadequate e-books in the library was their greatest challenge, while 61(26.4%) said it was power supply. The least challenge in the distribution was slow bandwidth, 22 (9.5%). Therefore it was concluded that the greatest challenges were inadequate e-books in the library and power supply in that order.

DISCUSSIONS

The students were very much aware to a high extent of the availability of electronic books in the libraries. This finding did not agree with [6] who reported that inadequate awareness has been acknowledged as a setback within the past few years due to the realization that the methods employed have been used overtime without success. Plus or minus, the library has a strong

role to play to ensure creating awareness regarding availability of electronic-books in the library. [26]. They found that e-book awareness and extent of e-book usage amongst the students was low. In that investigation, 57% respondents were not aware of the availability of e-books, while 60% of them have not made use of an e-book. This perhaps affected negatively the extent of usage that study.

In terms of frequency of usage, the study concluded that on the average, utilization of e-books by the students was weekly. This is above average. This finding did not agree with [26]; their research revealed that despite the accessibility to a wide range of e-resources (including e-books) their use rate was low.

A number of studies that dwelt on e-book usage found that even with increased awareness regarding the e-resource universally, it has been noticed that rate of use together with usage pattern in a number of educational libraries in African countries and Nigeria in particular appear very limited [27]. Despite the fact that a number of avid library patrons report that they visit library branches less but use the library website often for e-book downloads, the use of its print counterpart is more compared to e-books.

In a study of e-book usage and opinion at the University of Liverpool, it was reported by [28] that e-books were made use of primarily for schoolwork and for research inquiries. Undergraduate students exploit e-books also for study (80 %) as well as for research (71 %). That is, the students use e-books frequently. However, Faculty members to some extent have dissimilar usage routine, accessing e-books in smaller amount but frequently for learning purposes (31 %) but more frequently for research (85 %). Also, [29] researched on the frequency of e-resources use and found that the frequency of e-resources utilization including e-books was extremely low.

The greatest challenges to e-book provision and usage were inadequate e-books in the library and power supply in that order. This finding corroborates [24] who acknowledged that issues such as hardware/software compatibility and capability, maintenance, adequacy, storage, search / retrieval functionality, power supply [30], interface usability are likely challenges libraries will encounter when administering e-books.

CONCLUSION AND RECOMMENDATIONS

The study concluded that the respondents use the e-books to a very high extent; in terms of frequency of usage, the study concluded that on the average, utilization of e-books by the students was weekly; the greatest challenges to e-book provision and usage were insufficient e-books in the library and power supply in that order.

E-books are yet to be fully integrated into some libraries in Nigeria. However, the introduction of e-books in the university libraries studied has made substantial input compared to their print equivalent. Students are responsive to suggestions regarding particular resources by their friends, teachers, or a librarian. Therefore, educating both staff and students on how to appraise Web resources along with search tactics are imperative. In fact, awareness advocacy is highly required to enhance further usage. Ease of use remains the sole most important issue for information use. Library users prefer e-books only if the e-books make their learning and research easier, and their information needs assuaged. The speed of access, desktop/laptop access as well as the skill to download, print out the downloaded information in addition to knowing how to send research articles are factors that make use of e-books possible.

Therefore, aggressive e-book collection development is here suggested. Academic Libraries should make e-books readily available and easily reached so as to encourage more, the use of the resources.

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THE VALUE OF THE LIFE CYCLE IN THE DESIGN OF INFORMATION SYSTEMS

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Abstract: The article shows the methods of using life cycle models of information systems design, analyzes the processes of designing information systems, and compares the methods of using life cycle models.

Key words: information, system, information system, design, UML, information system life cycle, cascade model, spiral model, incremental model, comparison of information systems models.

INTRODUCTION. The development of society leads to the fact that human knowledge about nature is expanding so much that it is impossible to cover not only their entire volume, but also individual areas. At the same time, data in related fields is needed to create useful knowledge and products. Information systems theory is designed to help humanity overcome the shortcomings of narrow specialization, strengthen interdisciplinary ties, develop a dialectical vision of the world and systems thinking.

The Law of the Republic of Uzbekistan "On Informatization" dated December 11, 2003 is defined as "an information system - a set of organizationally regulated information resources, information technologies and means of communication that allow collecting, storing, searching, processing and using information."¹

The basic concepts of information systems design include such concepts as system, information information system, project, design.

The system comes from the ancient greek *sōstukma*, which means "whole, consisting of parts, connection", which means a set of elements that are interconnected with each other, forming a certain whole, unity.

A system is a set of elements interacting with each other and with the external environment based on certain patterns (L.von Bertalanffy) ².

Information is a detailed message, information about an event, by information we mean any information from the environment (nature or society) that we perceive through our senses (eyes, ears, nose, mouth, skin). An information system (IS) is a set of interrelated tools, methods, and personnel used to store,

process, and retrieve information in order to achieve a specific purpose. The integration of these components makes it possible to automate information management processes and targeted activities of end users aimed at obtaining, modifying and storing information.

PURPOSE. It consists in modifying, systematizing the information available in society, displaying the content, the essence of the life cycle when designing in accordance with the goal.

RESEARCH METHODS. To achieve this goal, theoretical and empirical methods of research and comparative analysis, modeling (design), direct and indirect observation, analysis and generalization of information, system, systematization, role, essence of the life cycle in system design were used.

A BRIEF ANALYSIS OF THE SCIENTIFIC LITERATURE ON THE TOPIC. The book "Designing Information Systems" by Russian scientist V. V. Anisimov describes existing information systems, their structure and design methods³.

The studies of I.Y. Kotsyuba, A.V. Chunaev and A.N. Shikov highlight the historical periodization of information systems, processes, activities of individuals that contributed to the development of information systems in this period⁴.

The broadest definition of an information system was given by M. R. Kogalovsky, according to which the concept of an information system should include, in addition to data, programs, technical means and human resources, communication facilities, linguistic means,

¹ Law of the Republic of Uzbekistan "On Information" dated December 11, 2003.

<https://fayllar.org/axborotlashgan-jamiyat-va-uning>

² Definitions of the concept "system". <http://fpi-kubagro.ru/opredeleniya-ponyatiya-sistema>

³ Анисимов В. В. Проектирование информационных систем / В. В. Анисимов. – Хабаровск: Изд-во ДВГУПС. 2006. – 112 с.

⁴ Коцюба И.Ю., Чунаев А.В., Шиков А.Н. Основы проектирования информационных систем. Учебное пособие. – СПб: Университет ИТМО, 2015. – 206 с.

information resources, showing that together they form a system that provides "support for a dynamic information model of some part of the real world to meet the information needs of users"⁵.

Researchers from the Punjab University in India, Monika Sethi and Anju Sharma, suggest that the presence of stable information provided in the development of information systems is the basis for making the right decisions in an organization, showing that an information system consists of five constituent elements: human, data, software, equipment and network with which they interact⁶.

Barishnikova M.Y. in her studies in the field of engineering management and information technology, she tried to clarify the standardization of information systems projects, the requirements of the ISO / IEC 12207 standard and the main, auxiliary and organizational life cycle processes in the design of information systems⁷.

Results and practical examples. If we focus on the process of designing information systems within the framework of ongoing research, then a project is a set of actions limited to a certain time and aimed at solving a specific problem or achieving a specific goal. Design is also the process of creating a claim for an object based on its primary claim or the algorithm required to create an object that does not exist under given conditions.

By the end of the 20th century, dozens of methods for designing and modeling complex systems had been developed. All of them differed from each other in terms of functionality, but in many respects there were opinions with similar approaches to the analysis and description of the subject area. There was a need to combine successful solutions into a single methodology suitable for most developers of information

systems projects. As a result of these processes, UML (Unified Modeling Language) was created.

A unified, approximate version of UML 0.8 was released in October 1995, and the first version of UML 0.9 was released in June 1996. In 1997, two versions of UML appeared simultaneously (UML 1.0 and UML 1.1). In 1998, the developers introduced version UML 1.2. In 1999, UML version 1.3 was released, and in 2001, UML version 1.4. UML 1.5 in 2003. This version has been adopted as the international standard ISO/IEC 19501-2005. Now the most popular version of UML 2.4.1 was released in 2011 and complies with the requirements of the international standards ISO / IEC 19505-1 and 19505. Auxiliary and visual programming tools that generate code directly from UML models using the C ++ and Java programming languages include Rational programs Rose and Visual Paradigm.

The life cycle of an information system is a period of time starting from the moment a decision is made on the need to create an information system and ending with the termination of its full use. The methodology for designing information systems characterizes the process of creating and maintaining systems in the form of an IS life cycle, expressing it in the form of a certain sequence of stages (stages) and processes carried out according to them⁸.

The life cycle model is understood as a structure that determines the sequence and interconnection of the execution of processes, actions and tasks performed throughout the entire life cycle of IS. Most often, the IS life cycle is represented by three cascade, incremental (growing) and spiral models.⁹:

The waterfall (cascade) IS model is a classical model and assumes a linear sequence of execution of the stages of building an information system. In other words, the transition from one stage to another should occur only after the work at the current stage is fully completed. This model was proposed by Winston Royce in 1970 and provides for the sequential execution of all stages

⁵ Коголовский М. Р. Перспективные технологии информационных систем. — М.: ДМК Пресс; Компания ИТ, 2003.

⁶ Monika Sethi (Panjab University, India) and Anju Sharma (Thapar University, India) nformation System and System Development Life Cycle. <https://www.igi-global.com/chapter/information-system-system-development-life/75744>

⁷ Братищенко, В. В. Проектирование информационных систем / В. В. Братищенко. — Иркутск: Изд-во БГУЭП, 2004. — 84 с.

⁸ Инюшкина О.Г. Проектирование информационных систем (на примере методов структурного системного анализа). Учебное пособие. Екатеринбург. «Форт-Диалог Исеть», 2014. 240 с.

⁹ Сенник Ю. С. Жизненный цикл информационных систем / Ю. С. Сенник, И. Р. Гребенников // Системный анализ и прикладная информатика. - 2015. — № 2. - С. 4 - 9. <https://rep.bntu.by/handle/data/19054>

of the project in a strictly defined order. The transition to the next stage occurs only after the complete completion of all the work of the previous stage.

At the first stage, the requirements for the problem to be solved are formulated, that is, the possibility of its technical implementation is investigated. Questions to ask here: "What is the problem? Can this problem be solved? What are the ways to solve this problem, etc."

And at the stage of analyzing system requirements, the question arises: "what should the information system do to solve the problem? What software gives effective results? Are the image values of the program used sufficient to create an information system." At this stage, the current system and its workflow are examined. The result of the system analysis stage is a list of system requirements and their priority.

At the system design stage, answering the question "how should the created information system work to solve an existing problem?", The result of the stage is a detailed design of a new or modified system. As a result of the information system design process, the input, output, interface, hardware, software, database, telecommunications, personnel and procedures, interactions and relationships between these components are shown in detail.

At the stage of coding the system, programmers are involved, an information system is practically created and brought to the state of a program using a programming language.

At the testing stage, if the program is a database, it is filled in, if it is software, then it is created and tested to the end. The result of this step is a fully functional program. The tested program is put into practice and its effectiveness is determined.

Over time, after the launch of the created information system, changes are inevitable. Over time, changes are made during the maintenance phase. At this stage, the inconspicuous errors of the previous step are corrected and brought to the desired level.

In the "waterfall" model, the system being created is reviewed and tested after the completion of each stage. If any error is found, it does not necessarily move on to the next step, but rather the previous step will be reviewed to determine the existing error. The "waterfall" model is much more convenient to manage,

because after each stage, all the work done is reconstructed and documented.

Advantages of the "waterfall" model:

- at each stage, a complete set of documents, software and hardware is formed that meets the criteria for completeness and consistency;

- steps taken in a clear sequence allow you to reliably plan working time and related resources (monetary, material and human).

Disadvantages of the "waterfall" model:

- the real process of developing an information system rarely fits into such a rigid scheme.

- the exact formulation of the initial requirements for the model information system, as a rule, it is difficult to fully formulate the requirements of the customer at the beginning of the project;

- the main disadvantage is that the development results are provided to the customer only at the end of the project. Incorrect formation of requirements leads to the fact that the system does not meet the needs of the client.

Incremental model of information system. Increment in English - increase, which means increase, includes the development of a pre-planned information system in the form of a linear sequential improvement, in several stages (versions) as capabilities increase.

This information systems life cycle model is typical for the development of complex and complex systems, and a clear idea of what the end result of the information system being created should be will be available both on the client side and on the developer side.

The disadvantage of the incremental IC model is that the stages of building the system are identical to the cascade (classical) model, and the advantages, unlike the classical strategy, are that the client can see and feel the results earlier. After the development and implementation of the first version, having seen the result, you can slightly change the development requirements or abandon it by entering into a new contract and offering the development of a more advanced product.

Spiral model of information system. The spiral model was developed in 1988 (an evolutionary or iterative model) by Barry Bem based on the classic Deming cycle PDCA (plan-do-check-act). Building an information system using this model involves several iterations such

as turning the spiral. Not all requirements are defined at the beginning of a project, and as a result of versioning, the requirements become more specific. At each turn of the spiral, the requirements for the creation of the next part of the information system are indicated, the quality of the work performed is determined, and a work plan is drawn up until the next turn of the spiral.

However, at each iteration (repetition), it is necessary to evaluate:

- project conditions and the probability of exceeding the budget;
- the need to perform another iteration;
- degree of completeness and accuracy of understanding of system requirements;
- the feasibility of completing the project, etc.

This life cycle model is used to develop innovative (non-standard) systems. At the beginning of work on the project, the customer and the developer do not have a clear idea of the final product, a clear definition of requirements, successful project implementation, and the presence of risks. In this regard, a decision is made to change the requirements for the creation of the system or to abandon its further development.

Advantages of the spiral information system model:

- the system allows users to quickly show a workable product, thereby activating the process of clarifying and filling out requirements;
- in the process of developing an information system, there is the possibility of changing requirements, which is typical for developments, standards;
- provides flexibility in project management;
- allows you to create a more reliable and stable system.

Graphical representation of the stages of the spiral model of IS includes:

- there is an opportunity to improve the development process
- the risks for the client are reduced, he can complete the development of an unpromising project with minimal financial losses.

Disadvantages of the spiral information system model:

- the uncertainty of the developer in the prospects for the development of the project

increases. This disadvantage is due to the previous advantage of the model;

- operations for planning time and resources for the entire project are complex. To solve this problem, it is necessary to set a time frame for each stage of the life cycle in advance. Although not all planned work has been completed, the transition to the next phase will continue as planned.

- the plan is drawn up on the basis of statistical data obtained in previous projects, and the personal experience of the developers.

The use of international life cycle standards in this work can significantly save effort, time and material resources.

CONCLUSION AND RECOMMENDATIONS. Speaking directly about information systems, we can come to the following conclusion. The rapid development of information systems affects all aspects of society, the system of continuous education, in particular, the system of higher professional education, and increasingly expands its capabilities.

If we talk about distance learning, then the information system suffers as its important element. Because this process is carried out directly with the help of information systems and technologies. Information systems provide the basis for fulfilling the main task of distance learning without direct contact between the educational process and the student. Information systems contribute to convenient distance learning, maximum perception of educational information, and economic benefits for students.

Information systems created in society, in particular the role of the life cycle in the design of electronic educational resources in the educational process, and the creation of electronic educational resources used in the implementation of education using the spiral model of information systems design, serve to increase the efficiency of the educational process, the principles of construction and classification of information systems, methods for constructing a logical data model, synchronization of the main stages of the spiral model of the information system

Based on the foregoing, we can conclude that the life cycle for the designers of any information system serves as a "guideline", the improvement of information systems in all areas,

in particular in the education system for society, requires an in-depth study of this area..

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INKLYUZIV TA'LIMNI RIVOJLANTIRISHDA O'QUVCHILAR OVOZINING O'RNI

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ANNOTATSIYA: Talaba ovozi tushunchasi inklyuziv ta'lim tushunchalari bilan chambarchas bog'liq bo'lib, bu jarayon hamma uchun ishtirok etish imkonini beradi. Ushbu bob innovatsion yondashuv qo'llanilgan tadqiqot misollaridan foydalanib, maktablarda inklyuzivlikni rag'batlantirish uchun o'quvchilar ovozi tushunchasini o'rganishga qaratilgan: Inklyuziv so'rov. Tadqiqotda hamkorlikdagi harakat tadqiqoti jarayonlaridan foydalangan beshta Yevropa davlatidagi boshlang'ich maktablar ishtirok etdi. Misollar tahlili bolalar va o'qituvchilar o'rtasidagi dialoglar orqali ovoz tushunchalari qanday suyuq va tuzilishi mumkinligini va inklyuziv amaliyotlarning rivojlanishiga olib kelishi mumkinligini ko'rsatadi.

Kalit so'zlar: Talaba ovozi, inklyuziv ta'lim, dialog, ovoz, bolalar, o'qituvchil, inklyuziv so'rov, maktablar.

KIRISH

Zamonaviy rus ta'limida tobora ko'proq bolalarga maxsus ta'lim berishga e'tibor berilmoqda ta'lim ehtiyojlari. So'nggi o'n yilliklarda jamiyatning nogiron kishiga munosabati tubdan o'zgara boshladi, uni jamiyatning teng huquqli va munosib a'zosi deb tan oldi, ammo baribir o'zining qo'shimcha muammolari bor. Odatda, oilada nogiron bola paydo bo'lishi bilan moddiy, maishiy, moliyaviy va uy-joy muammolari ko'paymoqda.

ASOSIY QISM

Tahlillar shuni ko'rsatdiki, nogiron bolalari bo'lgan oilalar orasida eng katta foiz to'liq bo'lmagan onalar oilalari. Ota-onalarning 15 foizi nogiron bola tug'ilishi sababli ajrashgan, onaning qayta turmush qurish imkoniyati yo'q. Shuning uchun, nogiron bola oilasining muammolari to'liq bo'lmagan oilaning muammolariga qo'shiladi. Oiladagi psixologik iqlim bog'liq shaxslararo munosabatlar, ota-onalar va qarindoshlarning ma'naviy va psixologik manbalari, shuningdek, tarbiyalash, o'qitish va tibbiy-ijtimoiy reabilitatsiya shartlarini belgilaydigan oilaning moddiy va turmush sharoitlaridan. Ota-onalarning nogiron bolaning paydo bo'lishiga bo'lgan munosabati bo'yicha oilalarning 3 turi mavjud: mavjud muammoni tushunmaslik bilan bog'liq passiv reaksiya bilan; giperaktiv reaksiya bilan, ota-onalar intensiv davolanayotganda, ular "shifokorlar-yoritgichlar", qimmatbaho dorilar, etakchi klinikalar va boshqalarni topadilar; o'rtacha ratsional pozitsiya bilan: barcha ko'rsatmalarning izchil bajarilishi, shifokorlar, psixologlarning tavsiyalari.

Ijtimoiy ishchi o'z ishida 3-turdagi oilaning pozitsiyasiga tayanishi kerak.

Nogiron bolaning oilada paydo bo'lishi har doim barcha oila a'zolari uchun og'ir psixologik

stressdir. Ko'pincha oilaviy munosabatlar zaiflashadi, kasal bola uchun doimiy tashvish, chalkashlik hissi, ruhiy tushkunlik oilaning buzilishiga sabab bo'ladi va faqatgina kichik foizlarda oila birlashadi. Nogiron bolaga ega bo'lish oiladagi boshqa bolalarga salbiy ta'sir qiladi. Ularga kamroq e'tibor qaratiladi, madaniy hordiq chiqarish imkoniyatlari kamayadi, yomonroq o'qishadi va ota-onalarning nazorati tufayli kasal bo'lib qolish ehtimoli ko'proq. Ko'pincha bunday oila yaqin atrofdagi mavjud bo'lishning noqulay sharoitlaridan bezovtalanadigan atrofdagilarning, ayniqsa qo'shnilarining salbiy munosabatini boshdan kechiradi (xotirjamlik, sukunatning buzilishi, ayniqsa aqliy zaifligi bo'lgan nogiron bola yoki uning xatti-harakatlari bolaning atrof-muhitining sog'lig'iga salbiy ta'sir ko'rsatsa). Atrofdagi odamlar ko'pincha muloqotdan qochishadi va nogiron bolalar deyarli to'laqonli ijtimoiy aloqalar, ayniqsa, sog'lom tengdoshlari bilan etarlicha aloqa doirasiga ega emaslar. Jamiyat har doim ham bunday oilalarning muammolarini to'g'ri tushunmaydi va ularning ozgina qismi boshqalarning qo'llab-quvvatlashini his qiladi. Shu munosabat bilan, ota-onalar nogiron bolalarni teatr, kino, ko'ngil ochish va hokazolarga olib bormaydilar, shu bilan ularni tug'ilishidan boshlab jamiyatdan butunlay ajralib qolishlariga yo'l qo'yadilar. Yaqinda shunga o'xshash muammolarga duch kelgan ota-onalar bir-biri bilan aloqa o'rnatmoqdalar. Ota-onalar o'zlarining bolalarini o'qitishga harakat qilishadi, uning asabiylashuvidan, egosentrizmdan, ijtimoiy va aqliy infantilizmdan qochib, unga tegishli mashg'ulotlar, keyingi mehnat faoliyati uchun kasb yo'nalishlari berishadi. Bu ota-onalarning pedagogik, psixologik, tibbiy ma'lumotlariga bog'liq, chunki bolaning moyilligini aniqlash,

uning nuqsoniga munosabati, boshqalarning munosabatiga bo'lgan munosabati, unga ijtimoiy moslashishda yordam berish, o'zini o'zi anglashni maksimal darajaga ko'tarish uchun maxsus bilim kerak. Ijtimoiy-iqtisodiy vaziyat o'zgarishi tufayli mamlakatimizda tibbiy-ijtimoiy yordam keskin yomonlashdi. Nogiron bolalarni tibbiy va ijtimoiy reabilitatsiyasi har bir bolaga individual yondoshishni hisobga olgan holda erta, bosqichli, uzoq muddatli, har tomonlama, tibbiy, psixologik-pedagogik, kasbiy, ijtimoiy, maishiy, huquqiy va boshqa dasturlarni o'z ichiga olishi kerak. Asosiysi, kelajakda u bilim olishi va mustaqil ishlashi uchun bolaga motorli va ijtimoiy ko'nikmalarni o'rgatishdir. Nogiron bolalarni ham davlat ijtimoiy ta'minoti organlarida, ham nogironlar jamiyatida ishonchli maxsus ro'yxatdan o'tkazish mavjud emas. Bunday oilalarni tibbiy-ijtimoiy ta'minlash bilan bog'liq turli tashkilotlar faoliyatida muvofiqlashtirish yo'q. Maqsadlar, vazifalar, imtiyozlar, tibbiy va ijtimoiy reabilitatsiya bilan bog'liq qonunchilikni targ'ib qilish bo'yicha axborot ishlari etarli emas. Barcha ijtimoiy ishlar bolalarga yo'naltirilgan bo'lib, oilalarning o'ziga xos xususiyatlarini inobatga olmaydi va tibbiy-ijtimoiy ishlarda oilaning ishtiroki ixtisoslashtirilgan davolanish bilan birga hal qiluvchi ahamiyatga ega.

Rossiyada olib borilayotgan demografik siyosatning davlat choralari, bolali oilalarga, shu jumladan nogiron bolalarga yordam berish tarqoq, samarasiz va umuman oilalarni hisobga olmaydi. Nogiron bolalari bo'lgan oila alohida e'tibor ob'ektidir. Bunday oila haqida ma'lumot olgandan so'ng, uni taqdim etish rejasini tuzib, ota-onalar uchun bunday bolaga qanday g'amxo'rlik qilish bo'yicha tavsiyalar ishlab chiqiladi. Har bir nogiron bola uchun pediatri bilan birgalikda reabilitatsiya rejasi tuziladi. Ko'pincha bola bilan ijtimoiy o'qituvchi, psixolog, nevropatolog, neyropsikiyatr, logoped, massaj terapevti, defektolog va fizik terapiya bo'yicha o'qituvchi ishlaydi. Nogiron bolalarni tarbiyalayotgan oilalar bilan ishlashning muhim yo'nalishi - bu nogiron bolalarning ota-onalarining jamoat birlashmalarini yaratish, bunday uyushmalarning mavjudligi, birinchi navbatda, ota-onalarda ularning yolg'iz emasligiga ishonchni kuchaytiradi, ikkinchidan, yordamga, tushunishga, umidga umid tug'diradi. bilim, tajriba, foydali ma'lumotlar bilan o'zaro

boyitish; o'xshash "baxtsizlikdagi hamkasblar" bilan muloqot doirasini kengaytiradi. Boshqa tomondan, bir muncha vaqt o'tgach, "baxtsizlikdagi hamkasblar" doirasidagi ushbu muloqot ijtimoiy dunyoni "biznikiga" va "biznikiga" bo'linishiga turtki beradi, bu esa o'z navbatida ularni jamiyatning qolgan qismidan ajratishga olib keladi. Nogiron bolani tarbiyalayotgan oilaga yordam berishning eng samarali usullaridan biri bu "ota-onalar klubi" dir. Ota-onalar klubi, rivojlanishida nuqsoni bo'lgan bolani tarbiyalayotgan ota-onalarning birlashmasi sifatida o'z oldiga quyidagi vazifalarni qo'yadi. o'z farzandining ota-onasi tomonidan etarli tasavvurni shakllantirish: "kasallik" tushunchasidan uzoqlashish va "rivojlanishning maxsus qonunlari" tushunchasiga o'tish muhimdir; bolaning shaxsiy, ijodiy va ijtimoiy resurslarini maksimal darajada oshkor qilish uchun oilada qulay mikroiklimni shakllantirish;

1. ota-onalar va bilimlarning o'zaro munosabati va bir-birini to'ldirishini amalga oshiradigan muassasalar, tajribani boyitish bo'yicha sheriklik munosabatlarini shakllantirish;
2. Ota-onalarning shaxsiy va ijtimoiy rivojlanishi, ijtimoiy faoliyat va konstruktiv xulq-atvor ko'nikmalarini shakllantirish.
3. Ota-onalar klubi turli xil ish shakllaridan foydalanadi. Ular orasida an'anaviy va noan'anaviy:
4. bolani rivojlantirish masalalari bo'yicha individual konsultatsiyalar;
5. joydan tashqari tadbirlarni tashkil etish: teatrlarga, muzeylarga, ko'rgazmalarga tashrif buyurish, shahar tashqarisiga chiqish va hk.;
6. o'quv seminarlari;
7. psixologik treninglar; ommaviy tadbirlar;
8. press-klublar va tematik davra suhbatlari; bolani oilada tarbiyalash tajribasini nashr etish; hukumat amaldorlari bilan uchrashuvlar;
9. "Bola - ota-ona - mutaxassis" tizimidagi darslar; bola rivojlanish dinamikasini tekshirishda ishtirok etish.
10. Ota-onalarning vazifasi bolani tinchlantirish, uning tashvishlarini engillashtirish, oilada optimizm muhitini yaratishdir. Ushbu oilada faqat ijtimoiy o'qituvchi yordam berishi mumkin.

Nogiron bolaning rivojlanishi ko'p jihatdan oilaviy farovonlikka, uning jismoniy va ma'naviy rivojlanishida ota-onalarning ishtirokiga va turli xil ta'lim ta'siriga bog'liq. Oddiy sharoitlarda bola manba hisoblanadi katta raqam uning harakatchanligi, ko'ngil ochishi va hokazolar tufayli ogohlantiruvchi vositalar. Nogiron bola ham o'qituvchisi uchun bitmas-tuganmas manba bo'lib, faqat ularning sifati birinchi holatga qaraganda butunlay boshqacha. Nogiron bola ko'proq mexanik ishni, bir xil parvarish va nazoratni talab qiladi, va boladan javob, quvonchli qoniqish juda kam, bu bir tomonlama charchoqqa, hatto charchashga olib keladi. Biz oilada majburiyatlarni bo'lishishga harakat qilishimiz kerak, va jamiyat o'z hissasini qo'shishi kerak. Oilalar inklyuziv maktablarni tanlaydilar, shunda ularning farzandlari odatda rivojlanayotgan tengdoshlari bilan o'zaro aloqalarini kengaytirishi hamda boshqa ota-onalar va o'qituvchilar bilan bog'lanish imkoniyatini yaratishi mumkin. Nogiron bolani tarbiyalashda oilaning sa'y-harakatlari uchun maktab o'qituvchilari tomonidan berilgan yuqori ijobiy baho oila va maktab o'rtasidagi samarali hamkorlik mexanizmlarini ishlab chiqishga xizmat qiladi. Buning uchun, avvalambor, hissiy aloqa, ishonch, hurmat va qabul, ota-onalarning ko'magi va ularning fikrlarini hisobga olish kerak. Oila bilan maslahat, profilaktika va tarbiyaviy ishlar hamkorlik g'oyasiga asoslanadi, uning ta'lim qobiliyatini oshiradi, ota-ona va bola o'rtasida uyg'un munosabatlarni o'rnatadi. Ushbu ishning maqsadi - ota-onalarning ta'lim jarayonida oilaning roliga bo'lgan psixologik munosabatlarini o'zgartirish; bola bilan munosabatlar uslubini o'zgartirish; oilaning pedagogik imkoniyatlaridan kengroq foydalanish. Bundan tashqari, ijtimoiy ish talabalar va ota-onalarni ularning huquqlari va majburiyatlari, qonunchilik hujjatlari bilan tanishtirishni, shuningdek Rossiyada va chet ellarda nogironlar bilan bog'liq jamoat va davlat tashkilotlari to'g'risida ma'lumot berishni o'z ichiga oladi.

O'qituvchilar nogiron bolalarni tarbiyalayotgan oilalarga nogironlikni ro'yxatdan o'tkazish va bolalarni o'qitish uchun maxsus vositalarni (tiflo va karlar uchun uskunalar) sotib olishda aniq amaliy yordam ko'rsatadilar. Boshqacha qilib aytganda, o'qituvchi bolalar va kattalar o'rtasida bog'lovchi bo'lib xizmat qiladi, ta'lim muassasasida ijtimoiy va psixologik

farovonlik muhitini yaratadi, ota-onalar va jamoatchilikni ijtimoiy ahamiyatga ega tadbirlarni tashkil etish va o'tkazishga jalb qiladi.

Oila bilan ishlashning asosiy maqsadi - barcha oila a'zolarining (jismoniy, ijtimoiy, ma'naviy, axloqiy, intellektual) shaxsiy rivojlanishi uchun qulay shart-sharoitlar yaratish, har tomonlama ijtimoiy va psixologik yordam ko'rsatish, shuningdek, bola va uning atrofini turli xil omillarning shaxsiy rivojlanishiga salbiy ta'siridan himoya qilish.

Oila bilan uyushgan hamkorlik jarayoni quyidagilarni o'z ichiga oladi:

1. yordam so'rovlarini o'rganish va tavsifi;
2. oila yashaydigan sharoitlarni tekshirish;
3. oilaning umumiy muammolariga oydinlik kiritish va uning xususiyatlari, boshqalardan farqi;
4. oilaning maqsadlari va umidlarini aniqlashtirish;
5. javob berish shakllarini kuzatish (ular jim, gapirish, janjal, tajovuzkor o'zini tutish, ishonmaslik va h.k.);
6. ushbu oilaga allaqachon yordam bergan va hozirda yordam berayotganlarni o'rganish;
7. uning a'zolari oilasidan chiqib ketishning ta'siri;
8. oilaning o'tmishini o'rganish;
9. oila a'zolarining shaxsiy xususiyatlarini o'rganish.
10. Oilaviy mehnat jarayonining bosqichlari:
Inklyuziv ta'limning sakkiz tamoyili.

Insonning qiymati uning qobiliyatlari va yutuqlariga bog'liq emas;

1. Har bir inson his qilish va o'ylash imkoniyatiga ega;
2. Har kim muloqot qilish va tinglash huquqiga ega;
3. Barcha odamlar bir-biriga muhtoj;
4. Haqiqiy ta'lim faqat haqiqiy munosabatlar sharoitida amalga oshirilishi mumkin;
5. Barcha odamlar tengdoshlarining qo'llab-quvvatlashi va do'stligiga muhtoj;
6. Barcha o'quvchilar uchun muvaffaqiyatsizlikka emas, balki qila oladigan narsalarga erishish ehtimoli ko'proq;
7. Turli xillik inson hayotining barcha jabhalarini yaxshilaydi.
8. O'qituvchilarning psixologik muammolari:

XULOSA

Inklyuziv ta'lim g'oyasi haqiqatan ham o'qituvchilar ongini egallab olsagina, ularning kasbiy tafakkurining ajralmas qismiga aylangandagina ta'lim jarayonida o'z o'rnini egallaydi. Buni amalga oshirish uchun alohida harakat talab etiladi. Inklyuziv ta'limni joriy etish tajribasi shuni ko'rsatadiki, o'qituvchilar va boshqa mutaxassislar darhol ushbu ta'lim shakli uchun zarur bo'lgan professional rollarga mos kelishni boshlamaydilar. Ular bir necha bosqichlarni bosib o'tadilar: aniq yoki yashirin qarshilikdan boshlab, passivga o'tib, keyin sodir bo'layotgan voqealarni faol qabul qilishga. Professional qo'rqishadi: "Men buni qila olamanmi?" Ular engishmaslikdan va ishlarini yo'qotishdan qo'rqishadi, mas'uliyatdan qo'rqishadi, tavakkal qilishdan qo'rqishadi. Qo'rquv va noaniqlik mutaxassislarning nima bo'layotganini to'liq nazorat qilmasliklaridan qo'rqishlari, o'quvchilar, ota-onalar yoki o'qituvchilardan yordam so'rashlari kerakligi va shu bilan ular mutlaqo barcha savollarga javoblari yo'qligini anglashlari bilan bog'liq. Bunday holatlarda berilgan maslahatlar oddiy: nima

bo'lishidan qat'i nazar, siz o'zingizning ishingizni bajarishingiz kerak. Siz o'z qo'rquvingizga duch kelishingiz va ularga qaramay ishlashni davom ettirishingiz kerak, shunda ular kichrayib boraveradi. "Islohotlardan keyin omon qolganlar bir necha hafta davomida qo'rquvni boshdan kechirganini, keyin esa sehr bilan o'tib ketganini aytdi. Har bir inson qo'rqanini eslaydi, lekin hech kim uning aniq nimadan qo'rqishini eslamaydi, ammo qo'rquv o'tib ketdi. Bu odatda olti hafta davom etadi - har qanday inqirozdan qutulishning umumiy davomiyligi. "Xavotir olmang. Qo'rqmang" degan so'zlarni talaffuz qilish ma'nosiz. Kiritish - bu o'zgarish. O'zgarish barchani qo'rqitadi. Bizning tanamiz shunday ishlaydi. Ammo bu holda, biz inson huquqlari to'g'risida gaplashmoqdamiz va biz ham o'zgarishlarga boramiz. Bunday inqirozda odamlar qo'llab-quvvatlashga muhtoj ekanligi aniq. Shunga qaramay, birinchi tajribalardan olingan saboq bu: qo'rquvga duchor bo'lish va boshqa tomonga qarash kerak; uni ism bilan chaqiring va davom eting. "

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